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COMPUTING PLATFORM 100

MEMORY 11

VIRTUAL MACHINE 115_N
APPLICATION 116_N
GUEST OS 117_N

VMEntry 119_N
VMExit 118_N

VIRTUAL MACHINE 115_1
APPLICATION 116_1
GUEST OS 117_1

VMEntry 119_1
VMExit 118_1

HYPERVISOR 111

DEVICE MODEL 113

CONTROL PANEL 114

HYBRID VIRTUAL MACHINE MONITOR 110

SERVICE OS 112

IN-HYPERVISOR DEVICE MODEL 1111

PROCESSOR 10

CHIPSET 12

MEMORY CONTROLLER HUB 120

INPUT/OUTPUT CONTROLLER HUB 121

FIRMWARE HUB 122

EVENT TIMRER 15

INTERRUPT CONTROLLER 14

I/O DEVICE 13

BIOS FIRMWARE 16

FIG. 1

HANDLING A DEVICE RELATED OPERATION IN A VIRTUALIZATION ENVIRONMENT
Benjamin Liu et al
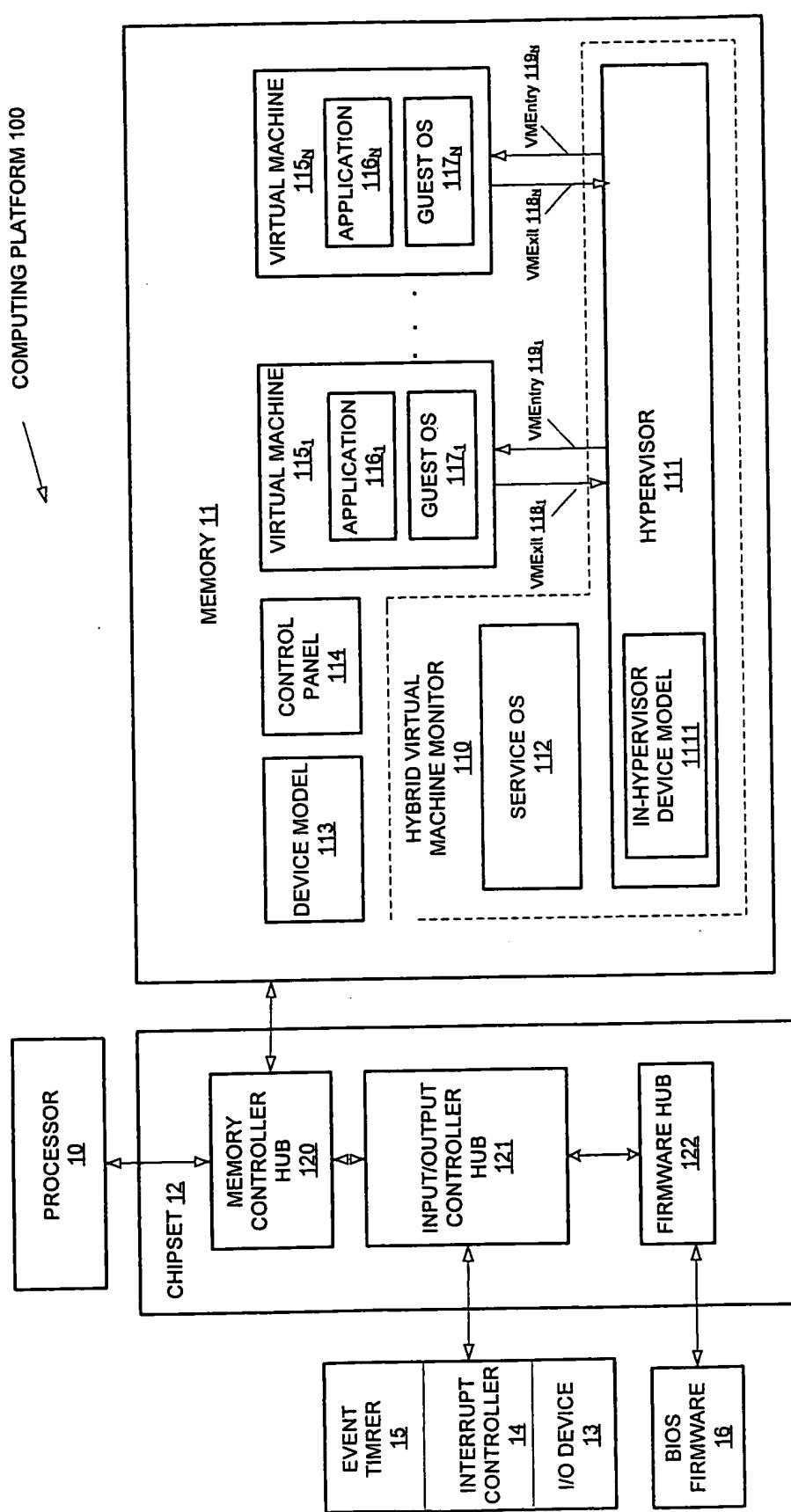FILING DATE: 4-20-06
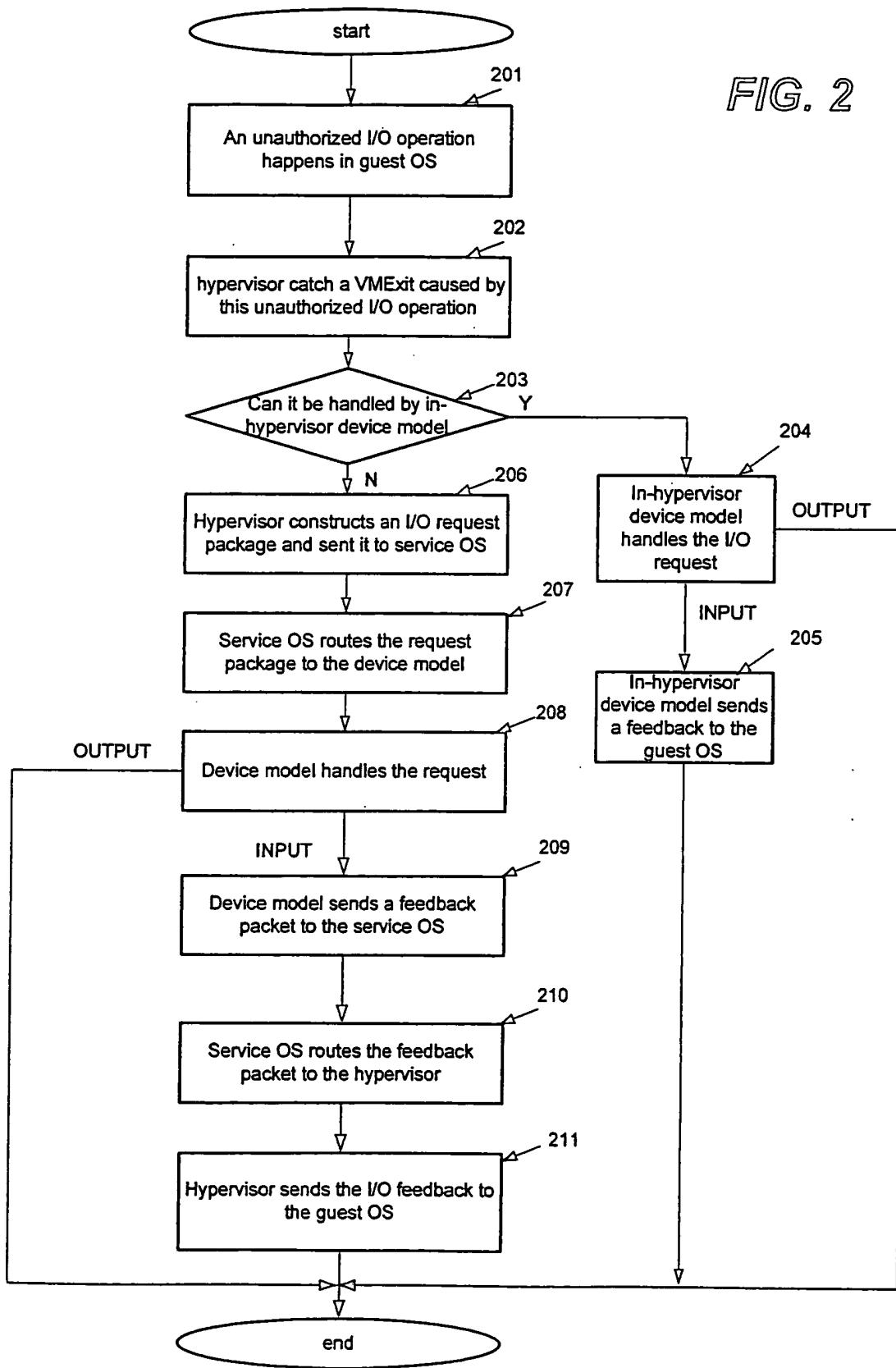ATTORNEY DOCKET NO. 42P22537

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FIG. 2

start

201
An unauthorized I/O operation happens in guest OS

202
hypervisor catch a VMExit caused by this unauthorized I/O operation

203
Can it be handled by in-hypervisor device model

Y

N

206
Hypervisor constructs an I/O request package and sent it to service OS

204
In-hypervisor device model handles the I/O request

OUTPUT

INPUT

205
In-hypervisor device model sends a feedback to the guest OS

207
Service OS routes the request package to the device model

208
Device model handles the request

OUTPUT

INPUT

209
Device model sends a feedback packet to the service OS

210
Service OS routes the feedback packet to the hypervisor

211
Hypervisor sends the I/O feedback to the guest OS

end

HANDLING A DEVICE RELATED OPERATION IN A VIRTUALIZATION ENVIRONMENT
Benjamin Liu et al
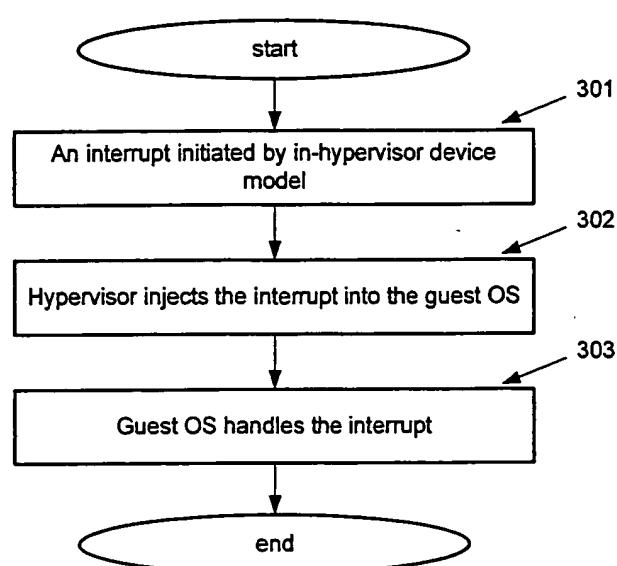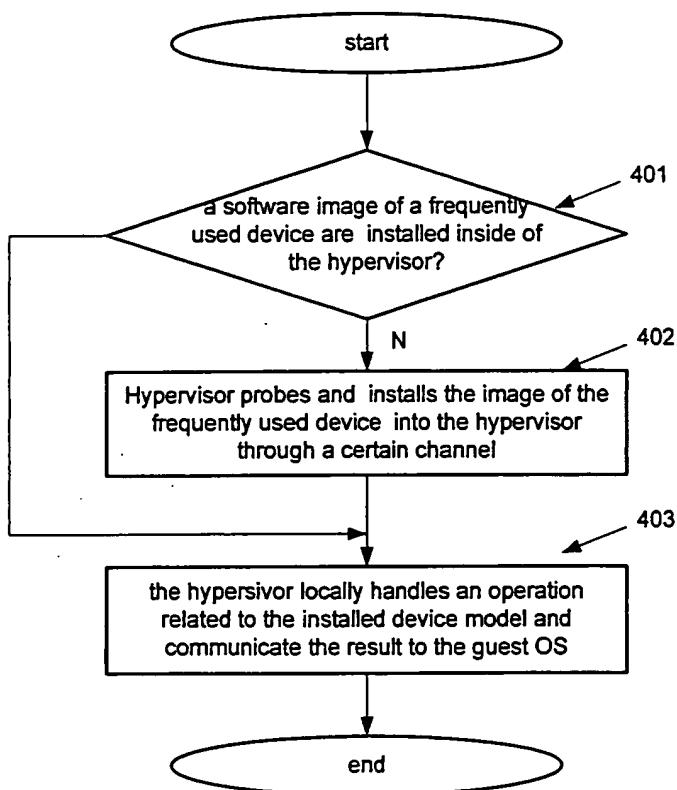FILING DATE: 4-20-06
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start

An interrupt initiated by in-hypervisor device model — 301

Hypervisor injects the interrupt into the guest OS — 302

Guest OS handles the interrupt — 303

end

FIG. 3

start

a software image of a frequently used device are installed inside of the hypervisor? — 401

N

Hypervisor probes and installs the image of the frequently used device into the hypervisor through a certain channel — 402

the hypersivor locally handles an operation related to the installed device model and communicate the result to the guest OS — 403

end

FIG. 4

HANDLING A DEVICE RELATED OPERATION IN A VIRTUALIZATION ENVIRONMENT
Benjamin Liu et al
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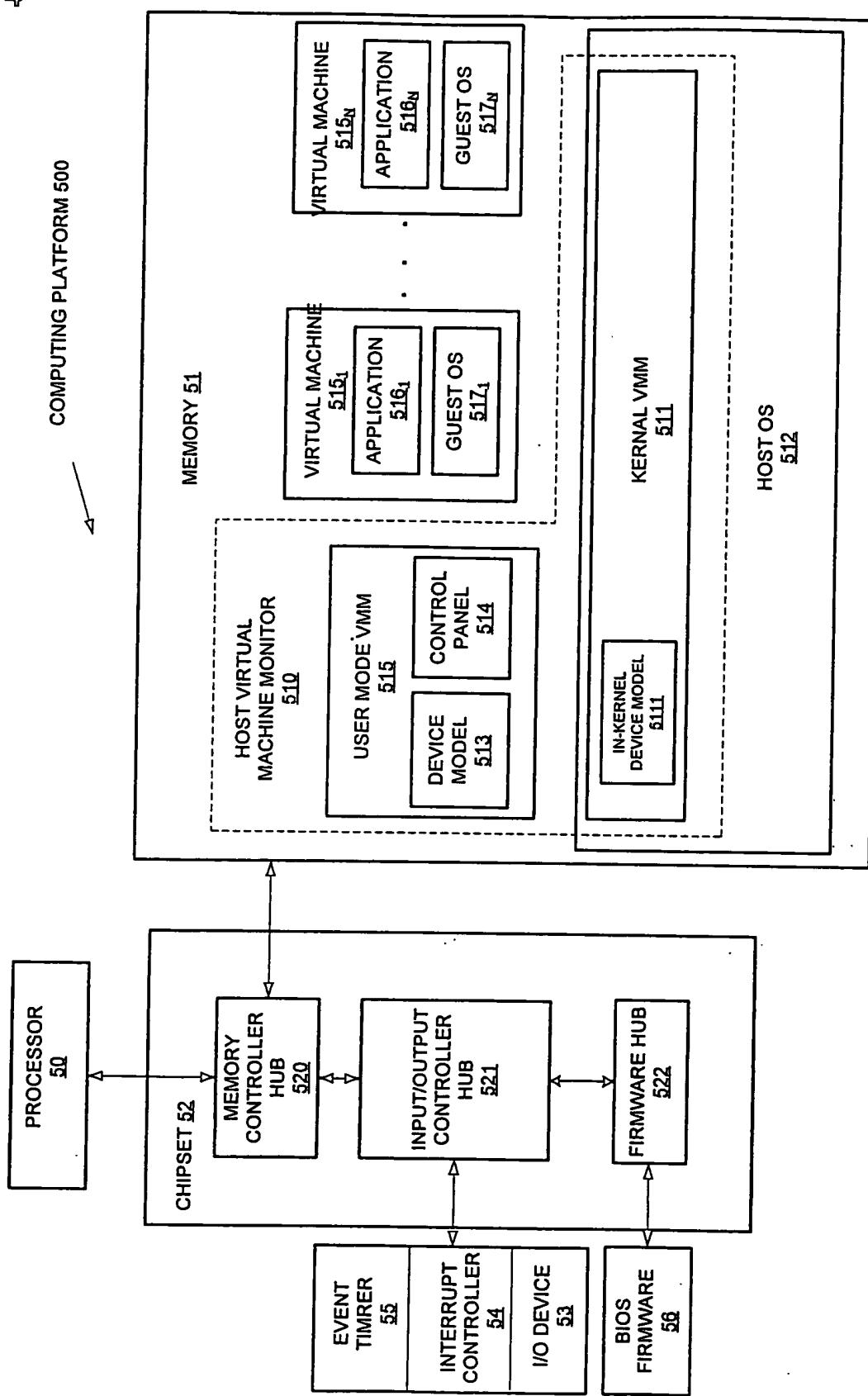ATTORNEY DOCKET NO. 42P22537

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FIG. 5